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at 25 cents each.

True Costs and Management Control

On February 7th last, members of the Montreal Chapter were the guests of the International Business Machines Co. Limited at their local office. There was a large attendance, and a most interesting and instructive time was enjoyed by all.

Mr. J. E. McKee, sales manager, delivered an interesting paper on "The Necessity of True Costs for Successful Management," which was followed by a paper presented by Mr. W. D. Jones, vice-president, on "Management Control." Both these papers appear below. Mr. C. Goldsmith, another representative of International Business Machines, gave an informative talk on the application of International Electric Accounting and Bookkeeping Machines as applied to the requirements of Accounting from a Municipal Government point of view. Following this a very complete demonstration was given of the various types of machines manufactured by International Business Machines Co. Limited.

THE NECESSITY OF TRUE COSTS FOR SUCCESSFUL MANAGEMENT

By J. E. McKEE

Sales Manager, International Business Machines Company, Limited

Business defined is really the usage of dollars. That usage in a manufacturing business consists of converting raw materials, plus dollars, spent for operating expenses, etc., into finished goods suitable to the tastes and demands of the consuming public. That is the aim of business—with the turnover of each dollar invested to realize, on its return and subsequent journey, a few cents excess, which is commonly termed net profit.

If there were only one manufacturer for each line of goods, it would be an easy matter indeed as prices would then be wholly within control. Then all that would be necessary would be to know the true cost of each article without regard to efficiency from a buying, operating or selling standpoint, and to determine selling price merely add a reasonable profit, but that is not practical because there is more than one factory manufacturing the same line, which makes it a competitive one and it is therefore necessary to manage the business efficiency in every division of the company.

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Price Control Rests Somewhere

In a competitive business the sales price is practically fixed or controlled by the most efficiently operated factory. That is particularly true if that factory is the biggest producer of the line, and if its costs are predicted on the basis of a fair return on capital invested. Since selling prices are rather balanced and in favor of the biggest producer of the line, other manufacturers, from an individual standpoint, must necessarily, so long as their sales prices are virtually fixed, stay within the limits of costs and yields of the chief competitor.

Of course, if the business, or rather the concern that sets the pace does not keep abreast with the times; if it does not take advantage of developments from the standpoint of production machinery and modern office equipment, the selling prices of the commodity manufactured by that company will be so high because of its inade-

NOTICE OF ANNUAL MEETING

The annual general meeting of the Society will be held on Saturday, May 30th, at 3 p.m. at the Windsor Hotel, Montreal.

W. A. McKAGUE
General Secretary

A "smoker" is being arranged by Montreal Chapter for the evening of the same day, of which Montreal members will of course be notified; any out of town members will be welcomed also.

quate methods and inefficiency, that an apparent wide margin of profit will exist. The apparentness of that margin is not real, but rather a mirage that might attract many smaller units of business throughout the country who would market so great a quantity of the line that the standing and stability of the bigger firm would face ruin unless changes are made so that costs may be reduced and a higher standard of efficiency realized.

So no matter from which angle the subject is approached there is no escaping the fact that management must at all times have before it true statements of costs as well as true statements that reveal the financial status of the business. It is not so easy these days to borrow money with which to operate business. The banker does not hesitate to demand a statement showing just how your

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business stands. He wants to know the ratio of liabilities to assets, the bonded indebtedness and investment in bricks and mortar, and he will also ask you at what capacity your plant is operating so that he can make deductions as to whether your production is carrying too great a load of overhead expense.

Executive Divisions

I would perhaps segregate a business as follows: First on the list, of course, is the president or general manager. In a great many cases he is selected from the sales force—but he must also be familiar with the manufacturing end of the business. Up to the time of his appointment as general manager, he, as a rule, has not given much of his time or attention to accounting and financial matters. While sales manager, the source of funds did not concern him to any great extent. Managerial duties, however, place upon his shoulders the responsibility of providing funds with which to operate the business. Then, and often then only, does he discover the real value of the accounting unit, which is the interpreter of his financial statements. He must look to his accountants for statistics covering turnover, accumulation of stocks, relation of output to capacity, etc., to keep him familiar with the cost of overhead expense at 35, 50 and 75 per cent. and full capacity, how much the falling off of volume raises his costs and likewise effects his margin of profit, all factors that are of vital importance and essential to effective management.

Naturally, to direct the business intelligently, he must know his true costs on all commodities offered for sale.

Operating directly under his supervision is the purchasing department; the next division is the factory superintendent, or the man in charge of operations; next the comptroller in charge of funds and accounting; the general sales manager, and the credit organization. The funds to build or purchase the factory and operate the business are placed in the hands of the comptroller subject to disbursement by the purchasing department, whose function is, of course, to buy as intelligently as possible, which is a very important matter. Overbought materials preclude any possible chance of profitable operation irrespective of the endeavours of the operating and selling divisions. With the delivery of materials to the factory additional expenditures are incurred for wages, fuel, power, etc., and the investment in its entirety passes into the hands—so to speak—of the operating superintendent where it goes through various stages of processing and finally the current funds are represented in the shipping room in the form of finished articles ready for disposition on the part of the sales organization.

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Accounting and Costs

The accounting unit records the expenditures as made by the purchasing and operating departments and by a method of cost accounting presents the costs of the various commodities. They, in other words, say to the management, "All current funds entrusted to our care are now in the form of goods in process and in finished goods at a cost of so much per unit and the selling organization must distribute on this basis plus other selling expenses and a figure representative of profit." One can readily see, therefore, that the accounting organization is the link between management, operating and sales, but in order for the business to carry on successfully, their deductions must be true and accurate.

While the costs as presented may be representative of conditions as they actually exist in the factory, it is necessary, in order to know whether the various departments have operated on an efficient basis, to maintain a series of running accounting facts showing yields obtained on materials processed, the cost per unit of production in its various stages, and by comparison point out to the management whether the plant is being operated as efficiently as it should be.

These data should be compared against previous months' costs, and if more than one factory is operated, the same units at the different factories should be compared. Selling costs should be also checked, and the cost to sell quoted, sales per man per week or month, in the terms of tonnage or volume shown, to point out the weak spots. One of the many functions of the accounting department, is to point out such conditions, leaving it to the management to apply the remedial measures.

Classes of Manufacturing Operations

In a general way and from the point of view of cost finding, the various types of manufacturing operations may be divided into three classes, each requiring a particular method of figuring or cost finding. They may be stated as follows:

1. Costs for ordinary manufacturing operations.
2. Costs for operations producing major products and by-products.
3. Costs for operations producing joint products.

In treating with the first case the general procedure is a very simple one. The steps are as follows:

- A. A known amount of material of a determinable cost is used.
- B. A definite amount of labor of ascertainable cost is expended.
- C. An average amount of overhead expense is absorbed.

The total is the cost of the finished goods from a factory standpoint, to which must be added the average cost to sell, plus a figure representing profit. Costs do not always determine selling price, but they should always serve as a guide. There are times when it is necessary for the selling organization to shade their

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prices to meet keen competition, and other times when they are able to obtain prices above the regular schedule, and, as a guide at all times, the costs as presented should be accurate and therefore true costs.

Major Products and By-Products

In treating with the second case the problem of determining costs is necessarily different. The costs of major products are usually computed by starting with the cost of the materials used, to which must be added the costs and expenses incurred, making the total outlay, deducting therefrom the value of the by-products produced, and the balance is the cost of the major or prime product. Because of variations in values, it is impracticable to attempt to find the costs of the by-products, and as they are not ascertainable, the costs of the major products would not be ascertainable except by deducting from the total outlay the full value of the by-products produced.

It is essential in figuring the cost of major products, that the full value of the by-products be credited. By full value, I mean the marketable value of such by-products in their first commercial stage, less any costs and expenses incurred in processing them to that stage, and also in marketing them. If an arbitrary or different valuation were used, the cost of the major product would not be determined correctly.

Joint Products

In treating with the third case the problem is again a different one, because joint costs constitute the disintegration of something of known cost in several of many parts, none of which may be termed major products. Being joint products it is impossible to figure the cost of each separately, though the cost of the whole group might be readily computed. It is almost always impracticable to apply an average cost to all of the various products for the reason that usually some are high grade and are therefore of relatively high value, while others are of medium or lower grades with relatively lower values. An average cost would therefore be misleading. It is therefore necessary to apply values to the joint products based upon their market values, comparing the total value of the production as against the cost of the materials plus expenses that make the total outlay, and a margin of profit or loss between the total costs and the total value of the products made.

Virtually all businesses come under one or more of these three classifications; however, each business has its own peculiar problems, and the cost system must be made to fit the business, the most essential feature being irrespective of which system, a true reflection of costs.

Need Speedy Records

It would be folly to attempt to meet the exacting demands of a modern cost system in an efficiently operated business without

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office machinery. Facts pertaining to the business must be broken down, comparisons must be accurate, and available immediately after the period has closed, otherwise they are of little use.

In considering turnover, which as a rule, is featured from a sales standpoint, we must not overlook the possibilities of a reduction in expense from an interest standpoint on monies tied up in stocks of raw materials and supplies in the various departments of the factory, in excess of the normal requirements to carry on the business. Dollars tied up in this fashion are idle and of just as great importance as the cashier's Department carrying thousands of dollars in excess of the requirement in the cash drawer—something that would not be tolerated for a moment.

Quite frequently the proper attention is not given to stocks of materials and supplies just because they happen to be out of the factory, but remember a dollar's worth of supplies carries just the same value as a dollar in the cash drawer and should be considered accordingly.

No business of any magnitude whatever, could be operated successfully for any great length of time without a very close and detailed check on operations. The management must have figures that reflect actual operations. Without them no manager could control the operating costs of certain articles, which might reach the inefficient stage. To furnish these figures it is absolutely necessary to have an efficient accounting organization. The accounting unit, in the case of factory operation, is vitally essential to the successful conduct of business, since it should reflect accurately the costs, the yields and the profits and losses to the management.

Profit Angle Emphasized

I would like to draw your attention to the method of analyzing results, particularly from an operating standpoint from the angle of profit or loss controllable by management. Quite frequently, due to a fluctuation in volume, the net profit or loss per unit of production shows to advantage or disadvantage, and unless you are quoting your executive a result per unit on controllable items, the executive is very apt to misjudge the efficiency of men actually in charge of operation and sales. The factory man directly responsible for operation costs may conduct his end of the business just as efficiently during a period of low production, as he did during periods of greater production by watching every angle of the business closely, thereby keeping his unit cost for direct expenses on a comparable basis, but when the fixed overhead expense is applied in order to show the net profit or loss, the realization based upon production does not show up favorably.

A controllable result is the profit or loss on expenditures that are within the control of management, which embrace such major

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items as materials, supplies, labor, fuel, power, etc. The major position of these costs fluctuate with production and are almost wholly within the control of management. I consider this one of the most important features in connection with the reporting of operating results to the executives from the standpoint of reflecting the real efficiency of management during periods of slack production. The operating division certainly should not be criticised for high costs when they are due wholly to the effect of the factory overhead because of light production.

Operating men are specialists, so are sales managers. They study, as a rule, in an intensive way, only one end of the line. Each has his own individual problems, but the accountant must ever give thought and analysis to the problems of all and must necessarily keep in closer touch with the general business rather than view it from just one angle.

It is more essential to use the brain as a productive machine than as a filing cabinet. It is very easy to conduct post-mortems, but it is inestimably more important to be a daily factor in the running of a business.

Management must provide for the general welfare of the business, it must meet competitive conditions, must produce its product on a basis that will give a fair return on the money invested in the business, and it must establish policies that will effectively perpetuate the business. In order to carry out this program, management is fully dependent upon the accounting department to properly guide its course and the accounting department can only perform this function through the medium of true costs.

MANAGEMENT CONTROL

By W. D. JONES

Vice-President, International Business Machines Company, Limited

In presenting the chart on management control, I do not feel that I am presenting anything original to you. It is such a chart as anyone of you could prepare, comprising as it does the principles and responsibilities of management, and the component parts of a business.

Adequate control is what management seeks. Control may vary from the rigid autocratic control of a well disciplined army to the loose control, for instance, that Great Britain exercises over her colonies, where the bond is affection and loyalty. Both may be, and the latter is effective.

In this connection the legend of the blind Greek poet Hebe may not be out of place, for he sang so sweetly to a wolf that he made

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him harrow all his land. This philosophy, too, has its place in management control.

Before briefly outlining the chart I would like to bring to your attention the most effective control that I have ever seen. It had to do with the tour of a large plant in the middle west. After an inspection of the various departments had been made, we were conducted to the power plant. The engineer was seated at his desk, smoking and reading at his ease, but opposite him as a series of steam gauges registering the steam pressure of every boiler in the plant. Here was effective control. He could foresee trouble before it happened, and do what was necessary to avoid it. The thought came to me that that was the kind of control that management should have if it were possible to obtain it.

Referring to the chart we see that the management of a business is responsible for the continued life of a business through conservation of the assets and the maintenance or the increase of profits. As explained in my opening remarks, I have not the time at my disposal tonight to enlarge upon the different aspects of these subjects. Here I would like to point out that there are certain kinds of industry, such as mining or oil, to which continued life through conservation of assets and maintenance of profits do not apply on account of the natural depletion of the ore and the oil resulting from operations.

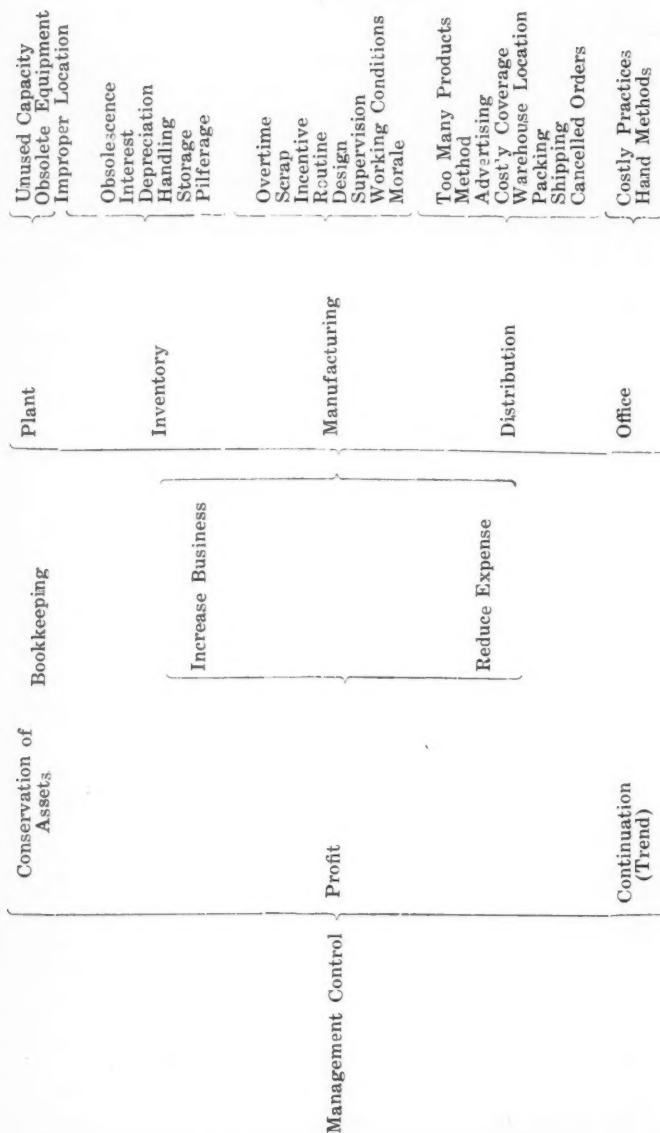
Conservation of Assets

Under conservation of assets we have some of the things that management has to concern itself with. Unused capacity, obsolete equipment, improper location. Take the question of unused capacity. Many companies, after the war, were given the option of buying government owned munition factories adjoining or on their properties. I know of one company which elected to buy such a plant for \$300,000, the finished cost of which was \$1,250,000. It was a bargain if they could use it, but it was more than they could afford and far in excess of their requirements. It proved a white elephant and finally brought them into the bankruptcy courts.

Profits

Under profit we note the two methods of maintaining it, or increasing it, i.e., increasing the business, or reduction of expense. Both present at times difficulties to management, the solution of which must be found if the business is to continue. Grouped with maintenance or increase of profit come the headings of inventory, manufacturing, distribution, and office. Under inventory comes obsolescence, interest on excess or slow moving parts, depreciation, handling, storage, and pilferage, all of which must be made the subject of study and analysis in order to insure direct control of these divisions of the business.

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Under manufacturing we have overtime. A word on this subject may not come amiss. How many companies have taken a contract where normally there would be a nice profit, but have seen it dissipated because of overtime, with time and a half rates, in order to meet delivery date brought about through improper scheduling or routing. Proportion of scrap must be watched. The proper incentive must be given. The management must also see that routing of materials through the shop is properly controlled, also design, supervision, working conditions, and morale. In regard to working conditions, I recall some years ago the case of an engineer who was not satisfied with the earth floor of the forging and blacksmith department of a large industrial plant in Cincinnati, and had it neatly bricked, but found that the constant jarring of the brick floor was too much for the nerves of the workers, and they had to go back to the earth floor.

Under distribution we have a number of factors. This question of distribution is occupying the attention of world leaders today, perhaps to a greater extent than any of the other processes of business. This is particularly true of the export trade, where nationalism and trade barriers have tended to exclude much of the merchandise which flowed between countries before the war. Hence the importance of watching and controlling closely the various ramifications of this subject. Some of the things to study under distribution are—number of products, method, advertising, costly coverage, warehouse locations, packing, shipping and finally cancelled orders.

Office Procedure

The fourth division of the profit group has to do with the records of a business—office procedure—with which you gentlemen are most concerned. In my opening remarks I mentioned that it was our desire to make this meeting objective in the sense that you would, on the termination of the addresses, visit our splendidly equipped demonstration and service bureau room adjoining and see our machines turning out statements and office records for our customers.

In the office today, you gentlemen are called upon to decide whether work should be done manually or by machine, and it is with the thought in mind that a practical demonstration of some of the work we do for our customers would be instructive and interesting, that we invite you to see the machines in operation.

A word on the subject of machines in relation to office work. It is well agreed that the accounting field has lagged behind the shop in its advocacy and adoption of labour saving devices. This may have been true in the past. Today, however, far reaching changes are taking place in accounting procedure, and the machine is taking its place in the office as it already has established itself in the shop. If a machine installation and two clerks can do in a month work that requires the services of six clerks, and do it more accurately at less

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cost, with less supervision, there does not appear to be a second economic reason why the manual process should be continued. Anyone confronted with such a condition would be justified in installing the machine and let change in personnel and natural retirements work out the surplus help. The machine has focussed the attention of the world on problems similar to the one cited, and the machine has been blamed for much of the distress incident to unemployment, but we should not confuse the machine with this issue. Our failure rests in our inability to wisely control the benefits that the machine brings to us. I have enough faith, however, to believe that out of our experience with the use of the machine, in the not far distant future we will learn how to distribute such benefits for the good of mankind.

Job Analysis

By HARRY TAYLOR

Canadian National Carbon Company, Ltd., Toronto.

(Before Toronto Chapter, January 30, 1936)

THE subject of "Job Analysis" is, as many of you know, a rather broad one. Its application is such that almost every business may profitably adopt some plan. A subject with such scope may be discussed from several angles, either of which would require considerable time for proper treatment, and would require an expert to explain its many ramifications. In accepting the invitation to discuss this subject tonight, I did so—not with the idea of posing as an expert, but rather as one who happens to have a little knowledge of the routine.

In presenting this subject, I shall attempt to explain what is meant by "Job Analysis," and point out certain basic factors or fundamentals that seem to apply to all systems, in so far as they affect labor analyses.

I do not propose to discuss the merits of any particular system, nor do I intend to make comparisons. A study of existing systems will, I am sure, reveal that a particular phase of one system which prompts one company to adopt that system, may be the very reason why another company rejects it. It must be clear then, that whether one system is better than another depends to a great extent upon your point of view.

JOB ANALYSIS

History

"Job Analysis" and "Scientific Management" I believe to be synonymous. Early references of what to-day we call "Job Analysis" are referred to as "Scientific Management."

Dr. Frederick W. Taylor seems to have pioneered the field in this work. He started about the year 1885, at the Midvale Steel Company, in Philadelphia. It was some few years later when outside industries commenced to notice Dr. Taylor's work.

Dr. Taylor's researches proceeded chiefly along two lines: first, the development of tools specialized both as to design and material, and second, the development of standards of production. The results of the experiments on the cutting of tools gave to all industry the present high speed cutting tools. The result of the second series of experiments was the development of rules and principles from which were developed job standards.

In the early days several men became interested in this phase of business, and as is usually the case, their approach to the problem differed somewhat. You have probably heard of some of the systems developed by these men. However, in passing, I might mention a few:

The Taylor Differential System
The Gantt Task with Bonus System,
The Halsey Premium System
The Rowan Premium System
The Emmerson Bonus System

There have been many other systems developed since, including that of Bedeaux.

What is Meant by Job Analysis

The dictionary meaning of the word "Analysis," is a consideration of anything in its separate parts and their relation to each other. If this definition is applied to a job the meaning of "Job Analysis," seems clear. In other words, we may say "Job Analysis" means the breaking up of a job to see what it consists of.

The Main Uses of Job Analysis

I shall mention four of the main uses of Job Analysis, although not necessarily in the order of their importance:

1. To determine the relation of one job to another.
2. To develop job specifications.
3. To develop job standardization.
4. The application of incentives.

How to Analyze a Job

Before we can analyze a job, we must have some suitable means of measurement. What ever system or basis of measurement we adopt, it should not be dependent upon a specific job, rather it should be flexible enough to analyze any physical job, regardless of its location or characteristics.

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As far as I know, no system has yet been devised that is not, to at least some extent, dependent upon the judgment of the analyst.

I will believe all jobs may be divided into two main classifications, human factors and mechanical factors. The human factors consist of those things which affect the workman, such as elements of fatigue, discomfort, and exposure to danger. The mechanical factors are those things which affect equipment and methods.

The human factors of jobs number seventeen. It is doubtful, of course, if any one job contains all seventeen factors, and even those factors that are present, will only be present in varying degrees. This condition of severity must be taken into consideration when the job is being analyzed. In mentioning the factors, I shall name some job where the factor is present.

Heat—Furnace man

Eye Strain—Watchmaker

Paced Work—Take off—automatic press

Exactng—Inspection

Danger—Electrician

Fumes—handling carbon tetrachloride

Tediousness—Handling extra small parts.

Dirt—Motor mechanic

Dust—Handling bags of flour

Contact on Body—Handling materials that will produce dermatitis.

Wet—Washing cars

Noise—Rivetting—Construction Job

On Clothes—Handling Coal

Exerted Force—Expending energy lifting or sliding—an unloader

Operating Cycle—Speed at which an operator is required to perform a job.

Working position—Refers to whether operator is standing sitting, or working in either of several other positions.

Learning Period—Time required to learn the job.

While I believe all systems recognize all of these factors, they do not all break them down to seventeen separate classifications. In some systems two or more may be combined with a higher relative value. In some systems you may find the classification covered, though, the caption is worded differently.

In developing a system of measurement it is necessary to arbitrarily assign points to each human factor proportionate to its value in relation to the other factors. These points should represent the least favourable condition likely to be found on any job for any given factor. For example—eye strain is presumed to exist to as great, if not greater extent, in the job of watch repairing than in any other

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job. The maximum points for eye strain then, represent the degree of strain present in watch repairing. Since the points assigned to the various factors are maximum values, we must, when we analyze a job, determine the extent any factor is present, so that we may allow a proportionate number of points in our analysis.

What is Meant by Base Rate

The base rate means the money value of a job as determined by analyzing the human factors, and translating this analysis into an amount of money in direct proportion as the relation of the job to the hiring rate.

The word "Base" itself is used in this work to describe other things besides rate. It is used to represent a unit of time, such as base time or standard time. It is used sometimes to represent a quantity, for example, base production or expected production. Where the base is not a money value, but rather a unit of time, an operator may earn time credits, which in some systems are paid for at the hourly rate of the workmen involved.

What is Meant by Job Specifications

Any job specification should list duties of the job. It should list all special qualifications necessary to fill the job; particularly anything unusual which will help the employment department in its selection.

The job specification should state whether a male or female is required, the approximate age, height, weight, strength, and educational requirements. It should show whether the job is heavy, medium, light, foot or hand operated, continuous, intermittent, monotonous wet, dusty, standing or sitting. There are, of course, many other factors that should be recorded, but I believe I have mentioned enough to indicate what is meant by a "Job Specification."

Summed up, I think we may say a "Job Specification" is a complete report of a job, together with a full description of the kind of workman most likely to successfully fill the job.

From the description I have given you, the value of a job specification to the employment department is quite obvious.

What is Job Standardization

Job standardization is not wage payment, although I have heard it mentioned as such. It is the developing of job standards; the finding of the one best way to perform a job at the time of the analysis.

It is the analyzing of a job from the point of view of equipment, layout, kind of materials and methods, having in mind the elimination of waste in any form. It is a study to find the best possible equipment the job and production will justify on the basis of cost

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and/or quality, then getting the most out of the equipment. It is a study to determine possible economies on materials, yet maintain the desired quality standards.

It is apparent from this brief description that this branch of job analysis is not only an important one, but a particularly large one.

"Job Standardization" is sometimes called "Process Analysis." A great many illustrations could be used to demonstrate its value.

Some time ago a certain production engineer was attempting to set standards for a job of shovelling a bulk material. He conducted tests with a shovel large enough to handle 38 lbs. at one time. He changed the shovel so 34 lbs. was handled and found the workman handled more material during the day. He followed this with a shovel to handle 30 lbs., and again the quantity per day increased. He changed shovels until finally he was using a shovel handling 16 lbs. The result of these tests showed that from 38 lbs. down to 21 lbs. the production increased, reaching a maximum at 21lbs. Below 21 lbs. the production per day decreased. You can easily see why the shovel capable of handling 21 lbs. was adopted as standard.

Another illustration of job standardization is where we have three operators, all doing the same job, and each producing the same quantity per hour. By time study or micro motion study, we may learn the job consists of three distinct elements. We may further learn that,—

Operator A	has the best method for	Element 1
" B "	" " " "	" 2
" C "	" " " "	" 3

If we can teach all of the operators the best method for each of the three elements, it is reasonable to expect certain economies due to increased production.

Application of Incentive

Possibly the most important point to consider in any wage incentive plan is simplicity. Any system that is so involved and complicated that workmen cannot figure their earnings is less likely to receive the support of the workmen than is the simple system.

There is a considerable difference of opinion regarding what constitutes a fair incentive over and above normal time rates. Some think 5%, others 10%, others 15%, and some 20%. Regardless of what percentage is considered a fair incentive, it should be in addition to time rates, and not in lieu of them, otherwise the incentive is more imagined than real.

In all labor analyses it is necessary to develop standard times, or tack, for normal output and desired quality, before any incentive may be applied,

Incentives may be designed for individual jobs, teams, or gangs.

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The company must decide on what its policy will be regarding payment for delays which occur through no fault of the operators. Many companies pay time rate for such delays.

There is another important factor in the application of incentives, and that is the allowance for fatigue and personal comforts. This varies with different systems, and even on different jobs, when the same system is used.

Cost Accounting

Job Analysis may not be a function of the cost dept., yet I am sure those of you who are engaged in cost accounting will readily recognize the necessity for close co-operation between the accounting division and that of production engineering.

Labor cost variations, as noted by the cost dept., are frequently tell-tales of inefficiencies which require some study by the production engineering dept. in order to reduce or possibly eliminate them.

The cost dept., of which the payroll division is usually a part, is generally responsible for preparing a report of earnings on the various rates in effect, so that unusually low or high earnings may be checked for change in method.

In those companies where standard costs are used, it is desirable to check the production engineering dept. for contemplated changes in rates, or the establishing of new rates before setting standards.

Conclusion

I believe with some plan of job analysis, the chance of establishing wage differences for like jobs is lessened. I believe, too, that job analysis should seldom, if ever, be adopted as a separate function in any company. It should be a part of a well balanced development which is carried throughout the entire organization.

When job analysis is tied in with planning and control, it is possible to effect economies not otherwise obtainable.

In closing, may I leave this thought with you—Any company that has not adopted some system of job analysis might do well to investigate its possibilities.

"Bredren," said the colored preacher, "you have come to pray for rain. Bredren, de foundation of religion am faith. Whar is youh faith? You comes to pray for rain and not one of yo' brings his umbrella."

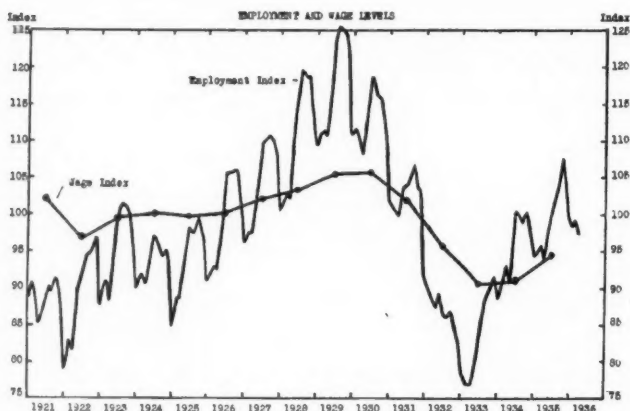
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Vicar—"I was grieved to hear your husband has gone at last."
Mrs. Maggs—"Yes 'e 'as, sir, an' I only 'ope 'e's gone where I know 'e ain't."

Employment and Wage Levels Improving

By W. A. McKAGUE

JUST three years ago the employment situation in Canada was the worst shown at any time since the records were started in 1921. Figured as a percentage of the 1926 level, the index had declined from a peak of over 125 per cent in 1929, to a low of 76.0 per cent in April, 1933. Now, three years later, it has climbed back to 97.4 per cent. This April figure was exceeded in only four previous years—1928 to 1931 inclusive, so that the statistics are not bad from the long term viewpoint. In 1927, which was rated as a rather good



business year, the April employment index was just even with the present.

The Canadian index shows a seasonal rise in most years from about April to November, followed by a winter decline. This is largely due to construction work in the summer months, and to the fact that retail business is best in the Christmas season. The extra relief burden in the winter months naturally arises from the same cause.

How is it, then, that relief lists show hardly any shrinkage, in spite of this substantial improvement in employment? That is the

EMPLOYMENT AND WAGE LEVELS IMPROVING

question which is now worrying economists and governments in both the United States and Canada, for the same situation is found in both countries. It has not been fully explained, but two or three points are evident. For one thing, there has been growth of population, which means that the same numbers can be employed now as in 1927, and yet there can be more unemployed. Secondly, many who lost their employment early in the depression did not have to go on relief at once because they had some savings. The using up of such savings in many cases has tended to hold up the relief lists during the past three years when employment has been actually gaining. Thirdly there is the suspicion, which unfortunately has been verified in a few places, that relief has become a political abuse; this is also receiving the serious attention of governments.

While volume of employment is of first importance, wage levels also have a direct effect on purchasing power. Here the recovery has not yet been so pronounced, but it is nevertheless evident in records of 1934 and 1935. Each year the Dominion Department of Labour compiles an index from prevailing rates of wages in typical trades, and the 1935 figures were recently issued. Expressed as a percentage of 1926, a peak of 105.8 per cent was reached in 1930, indicating that average wages had risen by 5.8 per cent in the period of prosperity. A subsequent low point of 90.3 per cent was reached in 1933. The next year showed a nominal gain to 91.5 per cent, and 1935 a more important advance to 94.1 per cent. It is logical that demand for labour had to improve for a time before materially affecting the wage level. Any sign of scarcity in a skilled trade usually brings a sharper rise.

The wage index is compiled from the following trades: Building, metal, printing, electric railways, steam railways, coal mining, logging and sawmilling, common factory labour, and miscellaneous factory trades. As several types of jobs under each of these trades are included, it should therefore be an accurate guide, and it is probable that wages not included follow a similar trend.

One point which is not brought out in either of these sets of figures, is the actual earnings of workers. The employment index, though dropping sharply in the depression, was more stable than most other figures, because it is made up from numbers of workers on the payrolls. In many places the situation was met by putting all workers on short time, which of course reduced earnings without reducing the numbers of employees.

The combination of rising employment and rising wages, if it can be maintained (and there is no reason to expect it to stop now) is bringing an extension and an increase in public buying power which is being felt in nearly all lines of business.

Statistics in Business

By A. J. PELLETIER

Chief, Demography Branch, Dominion Bureau of Statistics

(Before Montreal Chapter, February 14, 1936)

YOUR Chairman asked me if I would speak to you on statistics in business, or I should say what use is statistics in business, and also on the organization of the Dominion Bureau of Statistics. With this end in view, I have therefore, prepared an outline of the structure of the Bureau and attempted to show at one and the same time the object and methods of procedure of each of the Bureau's Branches together with their perspective uses to business.

Statistics have been defined in hundreds of different ways and every author writing a text book always begins with a brand new definition of his own. The term was originally applied to any inquiry concerning the social or political condition of the people without any particular regards to quantity, but we shall say that "Statistics are a method of demonstrating facts concerning the social life of men based upon the quantitative observation of aggregates," or "Statistics is only another word for information expressed in quantitative form." Every important country has a statistical bureau engaged in preparing figures to be used in connection with administration, business, etc.

Growth of Statistics

In Canada statistics date back to the foundation of New France in 1608, indeed we know from the writing of Segard, Champlain, the Relations des Jesuites that of the twenty-eight persons who wintered in Quebec in 1608 only eight survived. The immigration statistics of those early days, included the names of settlers, the size of family by age and sex, the month of arrival, the goods brought to this country, etc. The first parochial register was opened in 1621 and it is with the use of the parochial registers together with the early writings of the authors of New France that for some parts of the country we can trace vital statistics back to early Canada. The aid the government of the day gave to colonization and population is also known in detail; the rules and regulations connected with this aid are very interesting. It was in the year 1667 that the first "mandements" of Bishop Laval, asking for perfect registration, was given. Censuses were very frequent in those early days.

During the early British period statistics consisted in reports from the colonial governors.

STATISTICS IN BUSINESS

At Confederation, the division of function as between the Maritime Provinces and the Dominion, "the Census and Statistics" was allocated by the British North America Act to the Dominion.

"The Year Book and Almanac of British North America" a semi-official compilation was published for the first time in 1867. This began the annual publication of political and trade statistics, customs, tariffs, excise and stamp duties. Subsequently the title was changed to "The Year Book and Almanac of Canada—an Annual Statistical Abstract of the Dominion and a Register of Legislation and of Public Men in British North America." This publication continued yearly from 1867 to 1879. Seven years later (1886) the need of similar statistical compilations resulted in the publication of the "Official Statistical Abstract and Record of Canada." In 1879 an Act was passed requiring the collection, abstraction, tabulation and publication of "Vital, Agricultural, Commercial, Criminal and other statistics," and in 1885 an Act was passed providing for the taking of a census of Manitoba, the Northwest Territories and the District of Keewatin.

The establishment of the permanent Census and Statistics Office in 1905 was a landmark in the history of Canadian statistics. In 1912 a Commission to report on statistics was created by the Minister of Trade and Commerce and in 1915 the creation of the Dominion Statistician was effected. The Statistics Act passed in 1918 created the Dominion Bureau of Statistics and consolidated previous statistical legislation.

Branches of Bureau

The Dominion Bureau of Statistics comprises fifteen Branches as follows:—

Administration Branch—This branch is the centre of the organization. In the first place it is concerned with the administration of the personnel (1,300 at maximum). This branch also looks after supplies, distribution of publications, rota-printing, photostat and mimeographing service, central filing, library, publicity, accounting, etc.

Criminal Statistics Branch—The statistics published by this Branch include general criminal statistics, adult and juvenile criminal statistics. People sometimes wonder what use business could make of these statistics. Criminal statistics are largely used by Insurance Companies.

Automobiles and bicycles as well as other goods stolen and recovered, accidents of all kinds, number of doors found unlocked, etc., are asked for with great frequency. Welfare Supervision Boards of the Provinces and cities use adult and juvenile criminal statistics freely together with large demands from Law Schools and University Libraries.

COST AND MANAGEMENT

Census of Institutions Branch—This Branch publishes statistics on Mental, Charitable and Benevolent Institutions, Penitentiaries, Reformatory and Corrective Institutions, Directory of Hospitals.

The statistics as to the number and classes of sick persons treated and the type of hospital are of inestimable value to public health authorities. We have had an exceedingly great demand from business houses for our Hospital Directory, in which every hospital operating in Canada is listed and each type of hospital is shown with its various departments, such as X-Ray, Physiotherapy, Clinical Laboratories, etc. All the hospitals listed in the Directory are entitled under the Excise Act to receive medical, surgical and other supplies without paying the sales tax.

Animal Products Branch—This Branch is mainly concerned with the statistics of fisheries, furs, dairy products, manufacturing of miscellaneous animal products, such as slaughtering and meat packing, tanning, leather factories, fur goods, leather gloves and mittens, harness and saddlery, and miscellaneous leather goods establishments. Take the leather boot and shoe industry. There were 206 factories which manufactured 1,563,986 pairs of footwear during the month of December 1935. Is it not important for the leather boot and shoe manufacturers to know the total output of shoes, the value, the imports and exports, etc?

Annual Agricultural Statistics—Agriculture in Canada is the basic industry and it is very important that adequate statistics of its activities be available. (The agricultural statistics published by the Census are the definite figures as explained further on). The estimates produced by this Branch are the result of crop-reporting service organized in conjunction with the provinces. Each year a simple card-schedule is distributed to individual farmers. The cards are distributed and collected through the agency of the rural schools in New Brunswick, Quebec, Ontario, Manitoba and Saskatchewan, while in Prince Edward Island, Nova Scotia and British Columbia the cards are sent direct to the farmers. This Branch compiles and publishes weekly and monthly reports on the marketing of Canadian grain throughout the Canadian elevator system and monthly reports on commodities in cold storage, and elaborate annual reports upon the grain trade and live stock statistics respectively. Canada became one of the first adherents of the International Institute of Agriculture.

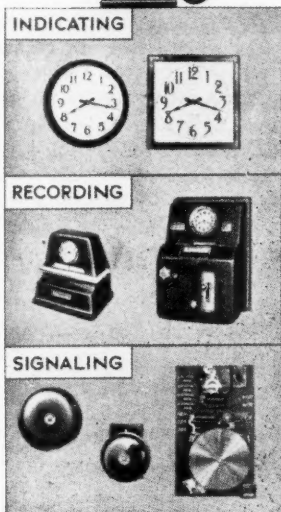
Forestry Branch—With regard to the use made of the Forestry statistics by business men, I might explain that the lumber, pulp and paper associations co-operate with us very closely in this work. In the case of all the industries covered by these associations, the questionnaires used by us are submitted to the associations annually and are designed and printed strictly according to their recommendations. The figures we collect, therefore, reflect the requirements of these manufacturers for statistical information.

COST AND MANAGEMENT



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We receive throughout the year, numerous statistical inquiries of a general nature from business men in general. There are, as you know, a number of trade journals and magazines on lumber, pulp and paper, and the contents of these magazines to a large extent are dependent on this Bureau for the statistical information contained therein.

General Manufacturing Statistics Branch—The purpose of this Branch is to cover the three remaining manufacturing groups not covered by other branches, e.g., vegetable products, textile and allied products industry, miscellaneous manufactures, i.e., construction, musical instruments, bed springs, mattresses, etc. It is important for a firm to compare its output with that of the industry as a whole, also the cost of materials and selling value of their products with the whole industry. Such a comparison enables the firm to ascertain whether they are getting their full share of the business and a check on the cost of material and selling value of products.

By publishing statistical information on products made in Canada, the necessary information is made available for making market analyses and economic research.

Mining, Metallurgical and Chemical Branch—This branch is divided into two parts—(1) primary production from our mines, and (2) secondary production or manufactures which use mine products mainly for their raw materials.

Iron and steel production and automobile production figures are issued monthly. These are considered good gauges by business men.

Here is an example of what manufacturing concerns think of our statistics. A few years ago the manufacturers of a certain commodity found themselves in rather a difficult position. Some companies had sold their entire production to the Christmas trade and assumed that they should produce more immediately after the new year. Other companies were not so fortunate. When the companies which had sold out began again to produce in large quantities they found that the companies who had not sold their output were selling at a sacrifice. The result was chaos in the industry. They had an Association but since it was made up of officers from the manufacturers they did not feel that they could have any compilation made by the Association without divulging the operations of individual companies. They came to the Bureau and said "We do not feel that we can trust each other but we can trust you. If you will compile the figures of production and inventory and publish the totals we will supply you with the necessary information."

They drafted a schedule to be used monthly, and let me tell you it was an elaborate affair, much more elaborate than we would have dared to send out since we know the feeling of the business men towards filling out schedules. We suggested that it be cut down

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but they maintained all of the data suggested was required. We printed the form and sent it out. It has been revamped each year to keep up with the types of models, etc., and just this year we wanted to know if this survey should be continued and the Association said by all means to keep it up. There have been many similar cases in the history of the Bureau.

Educational Branch—The method by which education statistics are obtained is as follows: (1) Of all publicly-controlled schools we obtain records through the provincial departments of Education. (2) Educational institutions that are not administered by Departments of Education receive questionnaires from the Bureau of Statistics directly.

Business men should be interested in our educational statistics for many reasons: (a) they represent the only Dominion wide record of the training of the young people they will receive to staff their businesses; (b) what they are studying; (c) how the schools are adapting themselves to the requirements of the modern world of industry; (d) whether or not they are trained to be future consumers for their particular line of business; (e) the costs of the formal educational process are met out of taxation, a matter of intimate concern.

The Canadian child now attends school ten years of its life, or half as long again as its parents. The cost of a child's schooling in recent years has been about \$750, and the other costs involved in raising it to maturity about \$5,000. Thus it costs no more to raise six children and give them an average schooling than to raise seven completely illiterate. More is spent in clothing a child than on providing its formal education, twice as much is spent on nourishing it, and nearly three times as much on housing it.

Canada has nearly \$600,000,000 invested in schools and universities. This represents about 2 per cent of our total estimated national wealth. It is about double our investment in telephones; equal to our investment in the electricity supply industry; comparable to, but less than, our investment in the mining industry, or in automobiles; about one-fifth of our investment in railways; and about one-tenth or less of our investment in farming.

The annual expenditure of schools and universities averages about \$160 millions. This approximates 3.5 per cent. of the total national expenditure. It is of interest to compare this with the expenditure on other educational organizations. For newspapers, magazines, books and other printed material we pay about \$100 millions annually, or roughly two-thirds as much as for schools and universities. The churches receive some \$70 millions annually, motion pictures about \$30 millions.

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Public Finance Branch—The financial statistics published by this Branch include Dominion, Provincial and Municipal finance.

Dominion Government Finance—The financial statistics of the Dominion Government have been fairly well maintained in uniformity since Confederation. In 1924, to satisfy a large demand, a compilation of the Civil Service of Canada and the expenditure on their salaries and wages was made.

Provincial Government Finance—Until the organization of the Branch, no attempt at correlation of the financial statistics of the various provinces had been made. In 1919 a classification of provincial accounts which shows the sources of ordinary revenue and the channels of ordinary expenditure was prepared, and reports were compiled and printed annually covering the years 1916 to 1926. Later a Conference of Provincial Treasury Officials with this Bureau resulted in uniform schedules.

Municipal Government Finance—There was never any attempt made to compile uniform statistics of municipal finance until the years 1919 to 1922 by this Branch. A classification of accounts was drawn up and sent to the urban municipalities having a population of 1,000 and over throughout Canada, afterwards a report was printed.

The reports proved very useful and demonstrated the possibilities of a uniform system of presenting such statistics for public use.

Transportation and Public Utilities Branch—This Branch compiles statistics on railways, street railways, express telegraph, telephones, water transportation, electrical stations and motor vehicles. It prescribed the classification of accounts to be kept by both steam and electric railways and the statistics to be compiled and the manner of compiling them, and the reports are made according to these classifications. The monthly traffic reports are in great demand by the general public. These reports show tonnages of freight carried by the railways, divided into 76 commodity classes and show the loadings and the unloadings in each province. These reports consequently give a fairly definite idea of the activity of many industries before the data on the industries themselves are available. The weekly car-loading report is used as a general business barometer and is very valuable on account of the promptness with which it is published. The data are collected and published on Friday of the previous week. The reports from the power companies, particularly the monthly reports showing the output, are very useful to business men. It is a fact that the production of individual industries are almost directly proportional to the power consumed.

Internal Trade Branch—The statistics published by this Branch are as follows:—

Price Statistics—These include Index Numbers of Dominion of Canada Long-term Bond Yields. This series indicates the movement

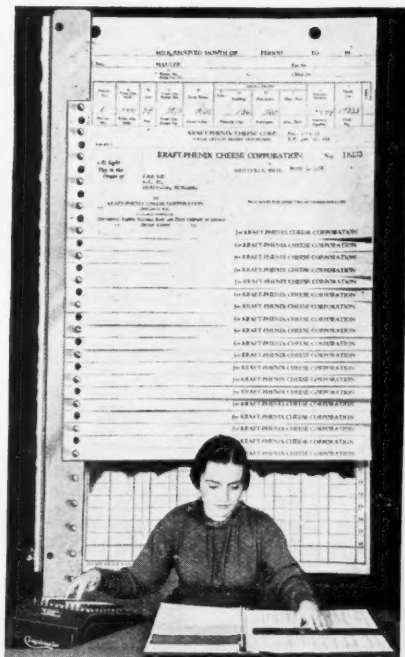
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COST AND MANAGEMENT

of long-term interest rates and of borrowing costs in the long-term capital market. It may also be used to trace the movement of bond prices; the cost of living index, which is frequently referred to in making wage adjustments in keeping with the rise or fall of living costs; security price indexes of industrial, utility, and mining stocks.

Capital Movements—Annual records and estimates of capital investments by foreigners in Canada and of Canadian investment in foreign countries; list of new concerns locating in Canada in recent years; Bulletin on branch and subsidiary industries in Canada; balance of international payments; compilation of Canada's annual balance of payments; estimation of the invisible items in Canada's trade balance. The balance of International Payments statement includes all debits and credits between Canada and the rest of the world. These statistics give a comprehensive picture of Canada's international debits and credits and how they are balanced.

Wholesale and Retail Trade—This Branch also makes an annual census of merchandising and service establishments. The first one made in 1931, provided the first complete survey of retail and wholesale trade in Canada, which was extensively used by manufacturers, wholesalers and large scale retailers. These statistics provide a great deal of the basic market information on which advertising and sales programmes and expansion plans have been developed. The annual summary which is now taken enables the business men to keep their market information up to date and thus provides a "yard stick" for different sections of the country.

External Trade Branch—This Branch compiles and publishes in great detail the external trade of Canada and keeps in close touch with the trade statistics of the Empire and foreign countries. The primary data for trade statistics are collected and compiled by the Customs Division of the Department of National Revenue and transferred monthly to the Bureau.

The publications of this Branch are numerous and among others is an advance mimeographed bulletin on trade in particular groups of commodities considered by manufacturers and others interested in particular lines of business, a quarterly trade report giving data by countries for the entire trade classification, and of the three annual reports the final annual trade report issued in December, is one of the most complete and elaborate trade publications put out by any country. Numerous special compilations are also prepared for individual subscribers each month and on occasion in response to particular inquiries.

It is not necessary to try and prove that these statistics are required by the business world. Without these statistics the importers and exporters, manufacturers, wholesalers, etc, would be working in the dark. The External Trade Statistics are probably the most discussed statistics.

STATISTICS IN BUSINESS

General Statistics Branch—The statistics published by this Branch cover the whole field of resources, history, institutions, social and economic conditions of the Dominion. Some of these statistics are published in convenient form for ready reference as they are digests of final data and are therefore invaluable to the man who has not the time to probe into the details of the many and voluminous reports of the various departments of the Government and yet require to be up to date in their knowledge and information. These are related so as to present a broad picture of Canada's position and by the regular revision of data respecting Canada for business almanacs, reviews, year books, etc, the business man's interests are indirectly served.

The publications of this Branch are as follows:—

The Canada Year Book—I need not describe the Canada Year Book. It will suffice to say that it is an official compendium of information on the physiography, chronology, production, trade, transportation, finance, labour, administration and general condition of Canada.

Other publications of this Branch are:—

National Wealth and Income.

Employment.

Commercial Failure.

Divorce; Tourist trade; Bank debit; Business Statistics, and Canada, the Official Handbook of Present Conditions and Present Progress.

Vital Statistics—There are many obvious and weighty reasons why any civilized country should have complete and accurate records of the movement of its population. Although the subserving of business needs has only a minor place in the purposes of this Branch of statistics, it is by no means valueless to the business men of the country. Enquiries constantly received at the Bureau show how many branches of business find it important for their purposes to have accurate knowledge of births, deaths and marriages.

Speaking of birth statistics you have probably heard the story of the lady who had three children and informed her husband that they were not going to have any more, because she said "I have read in a statistical publication that every fourth child born into the world is a Chinaman," and she added, "there are not going to be any Chinks in my family."

Generally speaking a marriage means the establishment of a new home with all the repercussions on the business world which such a fact implies. Is it not important then from the purely business standpoint to consider the effect which the recent depression had on

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the number of marriages in Canada. In 1929 there were 77,288 marriages. In 1930 the number fell to 71,657, in 1931 to 66,591 and in 1932 to 62,531. Thus if we assume that the level of 1929 would have been at least maintained had it not been for the depression, we may say that by the end of 1932 this depression had resulted in the non-existence of some 30,000 households which would otherwise have been established, what did this represent to the business world of Canada? To say nothing of the effect on the birth rate which this pronounced decline in marriages inevitably produced. The year 1933 showed a slight up-turn and in 1934 and 1935 there was a marked increase in the number of marriages, but we are not yet back to the level of 1929.

Census Branch—As already explained the Bureau collects information on as many subjects as possible of such features in Canada as yield to quantitative measurement and analysis. Every month thousands of forms of a large variety are sent out and returned to the Bureau. They have to be sorted and checked by experts, compiled and arranged in publication form, the work involved is tremendous. Of all the large activities carried on in the Bureau the Census is the largest. A Commission established in the United States to enquire on the Census stated that "Of all peace time activities the Census is the largest."

While speaking on Census it is interesting to know that the credit of taking the first census of modern times belongs to Canada. The year was 1666 and the Census that of the Colony of New France. The manuscript is still in the Archives of Paris with a transcript in Canada. Census taking dates from the dawn of civilization. The Scriptures tell us that Moses numbered the children of Israel. A census taken by King David provoked the Divine displeasure and led to disastrous consequences. Enumerations of the people were taken many centuries earlier, as in Babylonia (3000 B.C.), in China (3000 B.C.) and in Egypt (2200 B.C.) The Romans were assiduous census takers. Julius Caesar reformed the census. The Breviary of Charlemagne and the Domesday Book of William the Conqueror are celebrated medieval censuses. Later for several centuries, the census disappeared from Europe to be revived in Canada in 1666, some 150 years before it was revived in Europe. The ill-reputed census of David (1017 B.C.) lingered for 1,500 years in Europe and as late as the middle of the 18th Century in the British House of Commons the census was condemned by members, one said: "I did not believe that there was any set of men, or indeed any individual of the human species, so presumptuous or so abandoned as to make the proposal we have just heard." Another stated that his constituents "looked on the proposal as ominous and feared lest some public misfortune or an epidemical distemper should follow the numbering."

The Census as taken in Canada is a huge piece of work.

STATISTICS IN BUSINESS

For the 1931 Census we had 250 Commissioners, approximately 16,000 Enumerators in the field and 800 clerks in the Bureau. I need not explain what a tremendous piece of work it is just for the organization alone. The whole of Canada had to be divided into enumeration areas, described by metes and bounds, and these areas must not have more than 600 to 800 persons in the rural parts and 1,000 to 1,300 in the urban parts. The best example I can take to show the huge amount of work there is in connection with the census is the compilation of the returns. The first step in this compilation is revision. Every answer on the census schedule is checked by the best staff working on consultation with the heads. (The approximate number of possible answers on the agriculture and population schedules is close to a billion.) The information is then coded and rendered suitable to be transferred to the punch cards, which can then be tabulated by machinery.

The compilation of the census by means of a punch card mechanically sorted and tabulated is, of course, "an old story." In 1911 and 1921 the tabulators were fed by hand, and the results had likewise to be transferred by hand from strips printed on the machine. This process was slow and led to many errors. To overcome this, experiments were carried out in the Bureau for some time prior to the 1931 Census

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on the construction of a combined sorter and tabulator which, while completing any given sort, would automatically record all the items punched on the census card—at the same time enabling the results to be mechanically transcribed. These experiments met with success, and after an exacting test three sorter-tabulators were constructed in the Bureau's workshop during 1930-31.

The manner in which the sorter-tabulator operates is briefly as follows: The cards for a given area are in the first instance put through the machine for a given sort—say, by ages. As this sort is being made, every fact on the card is simultaneously recorded. Thus at the end of the first sort a summation of all the individual facts collected by the census is available. The cards are then put through for the second sort—say, by birthplace, during which process each fact on the card is cross-classified automatically for each age group resulting from the first sort. At the end of a limited number of sorts, every fact on the census card is cross-classified with every other fact. These cross-classifications are recorded on a traverse dial from which transcription is made by photography.

As a conclusion I may state that very many large business undertakings (financial, industrial and commercial) find it necessary to have statistical departments to utilize official statistics and collect further information. These undertakings realize that policy must depend upon the accurate ascertainment of facts and it is no less true for a private concern than for the government.

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